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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,528	07/02/2002	Ekkehard Pott	070255.0624	7313

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EXAMINER
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SOLIS, ERICK R

ART UNIT	PAPER NUMBER
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3747

DATE MAILED: 12/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/089,528

**Applicant(s)**POTT ET AL. CH**Examiner**

Erick R Solis

**Art Unit**

3747

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 12-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 12-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takaku et al (US Pat. No. 6330510) in view of applicant's admitted prior art at pg.3, paragraph 9 of the specification. This reference teaches a direct injection Otto engine having a stratified lean mode (layered lean) wherein NO<sub>x</sub> emissions are reduced by using a NO<sub>x</sub> storage catalyst. The engine also includes an external EGR system (not shown). Furthermore a control valve (7) which may be used to generate a tumbling flow is taught. This reference, however, does not teach the use of internal EGR. Applicant teaches at paragraph 9 of the specification, that similar engines are

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known which simultaneously use internal and external EGR. It would have been obvious to one of ordinary skill in the art to have included internal EGR in Takaku et al 's engine because this would have provided for more accurate distribution of EGR to all the cylinders and reduced delay times. Furthermore, the use of an EGR cooler is considered to be an obvious matter of design choice as they are well know in the art and would have aided in further lowering NOx emissions by reducing combustion temperatures. The use of an NOx sensor is also well known and would have aided in further refining control of the NOx emissions.

4. Claims 12-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura et al (US Pat. No. 6257197) in view of applicant's admitted prior art at pg.3, paragraph 9 of the specification. This reference teaches a direct injection Otto engine having a stratified lean mode (layered lean) wherein NOx emissions are reduced by using a NOx storage catalyst. The engine also includes an external EGR system (38). Furthermore a control valve (30) which may be used to generate a tumbling flow is taught. This reference, however, does not teach the use of internal EGR. Applicant teaches at paragraph 9 of the specification, that similar engines are known which simultaneously use internal and external EGR. It would have been obvious to one of ordinary skill in the art to have included internal EGR in Nishimura et al 's engine because this would have provided for more accurate distribution of EGR to all the cylinders and reduced delay times. Furthermore, the use of an EGR cooler is considered to be an obvious matter of design choice as they are well know in the art and would have aided in further lowering NOx emissions by reducing combustion temperatures. The use of an NOx sensor is also well known and would have aided in further refining control of the NOx emissions.

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5. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takaku et al (US Pat. No. 6330510) in view of applicant's admitted prior art at pg.3, paragraph 9 of the specification, and further in view of either of Wolters et al or Lippert. Takaku et al teach a direct injection Otto engine having a stratified lean mode (layered lean) wherein NOx emissions are reduced by using a NOx storage catalyst. The engine also includes an external EGR system (not shown). Furthermore a control valve (7) which may be used to generate a tumbling flow is taught. Takaku et al, however, do not teach the use of internal EGR. Applicant teaches at paragraph 9 of the specification, that similar engines are known which simultaneously use internal and external EGR. It would have been obvious to one of ordinary skill in the art to have included internal EGR in Takaku et al 's engine because this would have provided for more accurate distribution of EGR to all the cylinders and reduced delay times. Furthermore, the use of an EGR cooler is considered to be an obvious matter of design choice as they are well known in the art and would have aided in further lowering NOx emissions by reducing combustion temperatures. The use of an NOx sensor is also well known and would have aided in further refining control of the NOx emissions. Regarding the structure of the tumble plate (it should be noted that applicant's disclosure regarding this structure is somewhat vague and the drawing is not very detailed regarding structure) both Wolters et al and Lippert teach a tumble valve which can be laid against a wall of an inlet channel to allow air to pass freely through or can be set to provide a tumbling motion to the incoming air. It would have been obvious to one of ordinary skill in the art to have substituted a tumble control valve, as taught by Wolters et al or Lippert et al for valve (7) of Takaku et al 's engine, as they are essentially functional equivalents.

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6. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura et al (US Pat. No. 6257197) in view of applicant's admitted prior art at pg.3, paragraph 9 of the specification, and further in view of either of Wolters et al or Lippert.

Nishimura et al teach a direct injection Otto engine having a stratified lean mode (layered lean) wherein NO<sub>x</sub> emissions are reduced by using a NO<sub>x</sub> storage catalyst. The engine also includes an external EGR system (38). Furthermore a control valve (30) which may be used to generate a tumbling flow is taught. Nishimura et al, however, do not teach the use of internal EGR.

Applicant teaches at paragraph 9 of the specification, that similar engines are known which simultaneously use internal and external EGR. It would have been obvious to one of ordinary skill in the art to have included internal EGR in Nishimura et al 's engine because this would have provided for more accurate distribution of EGR to all the cylinders and reduced delay times. Furthermore, the use of an EGR cooler is considered to be an obvious matter of design choice as they are well know in the art and would have aided in further lowering NO<sub>x</sub> emissions by reducing combustion temperatures. The use of an NO<sub>x</sub> sensor is also well known and would have aided in further refining control of the NO<sub>x</sub> emissions. Regarding the structure of the tumble plate (it should be noted that applicant's disclosure regarding this structure is somewhat vague and the drawing is not very detailed regarding structure) both Wolters et al and Lippert teach a tumble valve which can be laid against a wall of an inlet channel to allow air to pass freely through or can be set to provide a tumbling motion to the incoming air. It would have been obvious to one of ordinary skill in the art to have substituted a tumble control valve, as taught by Wolters et al or Lippert et al for valve (30) of Nishimura et al 's engine, as they are essentially functional equivalents.


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***Response to Arguments***

7. Applicant's arguments filed 22 September 2004 have been fully considered but they are not persuasive. In particular, applicant's arguments regarding the 35 USC 103 rejection of all of the claims as being obvious over Nishimura et al in view of the admitted prior art or alternatively as being obvious over Takaku et al in view of the admitted prior are not found to be persuasive. Applicant's argument against both of the primary references Nishimura et al and Takaku et al is that since they do not teach a internal EGR they also don't teach a subsequent charging movement of the piston causing an intermixture of the residual exhaust gases. The examiner, has already acknowledged that neither of Nishimura et al or Takaku et al teach internal EGR, but this has already been previously addressed in the 35 USC 103 rejection. It is the examiner's position, as stated in the 35 USC 103 rejection above that it would have been obvious to include internal EGR in both of Nishimura et al and Takaku et al. Furthermore, the subsequent charging motion of the piston would inherently cause an intermixture of residual exhaust gases in any engine having internal EGR.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erick R Solis whose telephone number is (571) 272-4853. The examiner can normally be reached on Monday-Thursday.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-3700.

  
Erick R Solis  
Primary Examiner  
Art Unit 3747

ers  
December 12, 2004